

Reusable Open Source Software Component's Life Cycle Management

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Abstract— Software reusability is significant technique for improving quality, well-timed and cost-effective software development. Optimal usage of reusability ensures benefits in terms of human efforts, budget and time for good quality software development. Reusability of source code in terms of components also gives advantages to moderate the risk related with software development and its success. Because of unavoidable return, reusability has developed as the most established practice for the software development. However techniques and methods for reusability controlling are not properly managed. So necessity to formalize and straight procedure of reusability for getting its genuine paybacks in terms of efforts, time and cost savings are not much given attention so this paper presents the good and proper way to handle and manage the reusable components so that properly components can be used and record which are good in terms of compatibility so that other issues can be resolved as well. Structured and formal method is obligatory in reusability practices due to reusability classification, extraction, observation and deployment approaches are not well organized.

Keywords—Open Source Software, Reusable Components, Life Cycle Management and Software Engineering Trends

I. INTRODUCTION

As the distributed software engineering is not a simple task. In the distributed software engineering process the system design is obtained from the global requirements specification. Software reusability is a significant technique for improving quality, well-timed and cost-effective software development.

We have presented a frame work to sort out procedure of reusability in a well-organized and formalized way and we have suggest an efficient way to handle and manage the reusable components, so that components can be used and recorded which are good in terms of compatibility.

The best uses of reusability ensure payback in terms of human efforts, time and cost for good value software development. Reusability gives the return in the form of portability of softwares, maintainability and productivity improvements but the methods and techniques used for its assessment, checking suitability, selecting and deployments of component are not well structured so its gain is not according to the satisfaction level. So there is a need of a well structured and proper approach in the use of reusability to get the results up to the desired satisfaction level.

In this paper an approach is defined that illustrate the life cycle for reusability components. Actions performed during

reusability life cycle are formalized in proper format as shown in Fig. 1. Adopting this approach will lead towards satisfactory end results. In this approach re-useable components are searched and an open source repository is selected that is used to configure the required components, stored and classified in the repository on the basis of certain characters to make searching and retrieval process efficient [13].

In this paper we have proposed a frame work to sort out procedure of reusability well organized and formalized. In our methodology quality producing criteria's are defined at all levels of reusability procedure to find out reusable components, to identify and recognize the need of reusability, categorizing them and then incorporating them with new systems flawlessly and efficiently after removing the compatibility issues.

In this paper section 2 describe the literature survey. Section 3 describes the code reusability in open source software. Section 4 describes the life cycle model for software reusability. Our proposed approach is defined in section 5. Section 6 describes the Google trends towards open source. In section 7 analogy of collaboration in M learning to open source software is defined. At last section 8 conclude the paper.

II. LITERATURE SURVEY

Studies and uses of robots in computer science classes are proved to be very informative and attractive for the students. In this paper an introductory course about C language is discussed by using robots. Focus is one designing a course structure for CS course by using robot also cover the imperative problem solving concepts. There are two courses discussed i.e. CS1 that focuses on functional problem solving and CS2 focuses on imperative problem solving. Some pedagogy elements like lab based approach, student practice, sequence of topics are discussed as well. Robot based curriculum for C language is defined by defining course outline and list of module etc [1].

So the collaboration of machine and human for learning and concept understand becomes easier for the students. Open source software is freely available and it can be used to make examples and working learning objects for the students to graphs computer science concepts especially software engineering methods and models.

In this paper a quantitative method named Q metric is discussed that is focused on measuring the coherence and coupling between the software systems that are already decomposed in the software modules. These modules are divided or categorized according to the network structures. In the discussed me-

thod source code modules are being represented as network nodes and module's intercommunication is shown by networks edges whenever a source code module send any message to another module then a edge show this communication between two nodes [2].

In a distributed systems development to drive the behavior of individual component a transformation process is discussed. This process drives the behavior in the form of finite state machine from the global requirements of a distributed system that are described using activity diagram. This process consists of three steps first to define the source Meta model in which we specify the requirements of the global system. Second is to decide target Meta model that describe the system's local behavior at design level. In the last rules are defined that govern the transformation process. A case study is also discussed in which these steps are implemented [3].

To reuse analysis pattern a spatial data infrastructure (SDI) based method is discussed that use web services and meta data to represent the analysis pattern. This method focuses on the cataloging and reuse of analysis pattern that mostly used in requirement analysis phase and conceptual modeling phase. Some Meta data standards are discussed that are used to standardize the data like CSDGM, ISO 19115 and Dublin core. Based on SDI analysis pattern reuse infrastructure is discussed that used web services and can be accessed by humans and software clients easily [4].

A tool named Arduino is discussed that is used for interactive artwork purposes. It is discussed how we can utilize the latest technologies in art works and make it more creative and useful for environmental issues. A questionnaire about the water pollution is designed to test the tool and different users are asked to give their comments against the questionnaire. As Arduino has its own processing, memory and input out put capabilities so it provides the results according to the given comments in questionnaire in a more precise and organized form [5].

It is evaluated that how a formal software engineering course effect on the student's knowledge during study period and how it is utilized in real world projects. Target is to improve the knowledge of the students to the expert level so that they can make better decision while facing real life complex problems. A survey is conducted and students are asked to answer the questions in the survey. On the basis of this survey statistical analysis are performed to check the learn ability level of the students. Theses analyses are further utilized to improve the learning capabilities of the future students [6].

A web based java code editor named cored is discussed that have the capability of error checking and automatially generating code for the java applications. Now a days Web has becoming the platform for almost all real time collaborative applications. Collaborative real time editor (CoREd) is a web based code editor that is initially designed for java and vaadin framework languages.architectue of vaadin framework is discussed in which arvue IDE is used to access the editor and overview of the framework to the JDK is discussed that is defined as the base of the whole this work [7].

III. CODE REUSABILITY IN OPEN SOURCE SOFTWARE

Reusability of code has played a very important role in

open source software development (OSS) however till now there is no any formal analysis of code reusability are conducted in the Open Source Software Development. A lot of open source projects are explored and qualitative and quantitative data is collected from them and it comes to know that code reuse is broadly used by the OSS developers. Developers in organizations apply such tools that minimize the searching cost for information and code retrieval and judge the quality of components. It is revealed in the paper that why OSS developers reuse code. They wish to include functionality as quick as possible by writing ideal code, as they work under incomplete resources in provisions of instant and required skills, and reduce cost by using code reusability [8].

IV. LIFE CYCLE MODEL FOR SOFTWARE REUSABILITY

The reusable components minimize the production cost of a project. In order to create a reusable component we must pay special attention to the analysis, design, and modification in the component and its quality assurance. So lifecycle model is needed in this regard to manage all these steps in the creation

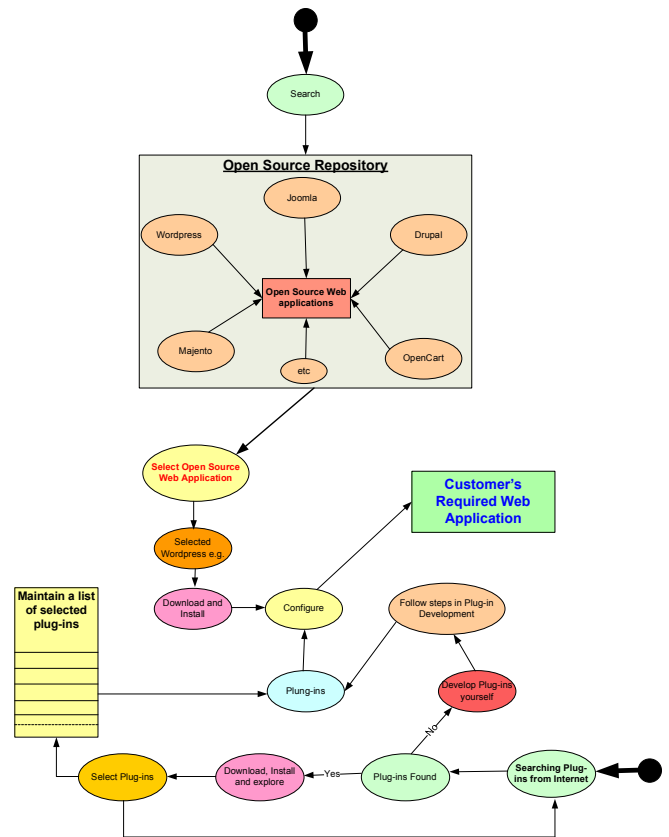


Fig. 1: Work Flow of Web Application Development

and management of the reusable components. A new model is discussed that introduce a set of phases for the management of reusable components these includes creation and storage of coponents, searching components, modification and reuse the component and repository administration [9].

The paper deal with the transformation process and also define an approach that is used to obtain the behavior of the given system component form is global system requirement. The approach is based on the technique of meta-data transfor-

mation. That defined source, target, meta-data different rules and constants used for this approach. The given approach is based on: the requirements of the Meta model, deciding of the Meta model, and the rules for this model. This approach used the Basic Meta model, which consist of “The requirement meta model” and the target Meta model. For the information this proposed Meta medal is also consider as source model. In which different classes and association for the Meta model activity diagram. The next thing defined the model the derivations process and also the rules and constrained that cannot be followed are defined [10]. As in Inter organizational collaboration need multiple organizations whereby individuals work together to a general reason to get business benefit. If the collaboration is fully and thoroughly understand then it will be helpful in making intelligent decision for the collaborative scheme. The different factors which are involved in the structure of the collaboration are the nature of the partner, the nature of the product, academic institutions, knowledge and information flow etc [11].

V. OUR APPROACH

Our model shows that how the reusable components are accessed over the Internet and integrated into the system. In the start we search out the desired component and select the open source repository for managing those components (Fig. 1). As shown in the Fig. 1 that we select any content management system for the open sources web application, it may be wordpress, joomla, Drupal etc. after selecting the CMS we download and install it and then configure the customer required application by making use of already developed list of plugins or by creating new ones. There are certain steps to develop a plugin and we have to follow these steps in order to create a valuable plugin for our use. On the other hand if we want to use the built-in plugin then we search for it in the list of already developed plugins. If the required plugin found then we download and install it and then explore the plugin to verify that whether it satisfy our requirements or not.so as we see in this whole process that if we have a well defined method for reusability of any software component then the benefits enlarge in terms of cost, effort and quality.

VI. GOOGLE TRENDS TOWARDS OPEN SOURCE

The “Google Trends” towards the open sources software development is tend to decrease with passage of time and as we can see in the Fig. 2 that search volume index in 2004 is very high as compared to the index in 2011. So it is clearly visible that open source developers minimize the use of google

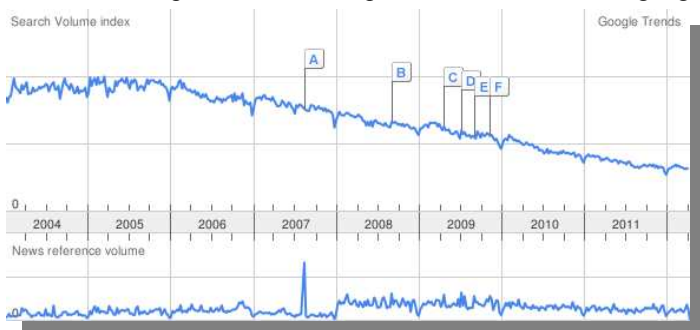


Fig 2: Google Trends: Open Source (All regions, all years)

trends for the reusable open source software component’s development. This can be resolved by adopting a well defined life cycle method for using the reusable components as discussed in our approach section. Open source is very powerful interms of development effort and time consumed to purify the software after involving the community of developers around the world so the need of recording and maintaining the catalog of the software components can make it better.

VII. ANALOGY OF COLLABORATION IN M-LEARNING TO OPEN SOURCE SOFTWARE

It is expressed that how the M-learning applications are designed for the assisting the collaborative process by using the virtual environments. The features of M-Learning application and advantages of integration of social network platform are described that suggests that the cataloging and making the record of the used open source software components is necessary so that the total cost and time for the development of new software can be reduced dramatically by integrating the tested and cataloged components.

The virtual organizations use collaborative system in which the people share different resources needed for the application to achieve a common goal. In the virtual environment collaborative systems are implemented by virtual campus, the virtual labs and virtual enterprise where the offices are in different location of the countries or world. Their employee relocated from one place to another to fulfilling the needs of their organization to access the resources from different location. They need the mobile application because of their light weight, low power consumption and portability.

This describes the different type of M-Learning application and mobile learning process. The first thing expressed about the collaborative virtual organization in which the different features of virtual organization are defined that worked as a collaborated way. Third thing that expressed is the designing of M-Learning applied for smart phones are defined. Next thing that expressed is Development of mobile learning application for the virtual campus in which defined the how to develop and implement the M-Learning application. In the last section metrics are built for the process of the evaluating the performance in the collaborative virtual organization [12].

VIII. CONCLUSION AND FUTURE WORK

Software reusability is a significant technique for improving quality, well-timed and cost-effective software development. Best possible usage of reusability ensures benefits in terms of human efforts, budget and time for good quality software development. The precious use of reusability has improved the quality of the software, production and maintenance of the software. However in the use of reusability methods and techniques there is need of prescribed and organized approach.

This approach deliberated to get actual payback of reusability in the shape of less cost, effort and time. In this condition, a framework is suggested to adopt the formal techniques and methods in the context of reusable Open Source Software component life cycle. Our model shows that how the reusable

components are accessed over the Internet and integrated into the system. In the start we search out the desired component and select the open source repository for managing those components. At the deployment stage reusable components evaluated according to new system requirements and the most suitable component is selected.

Future work in this regard expected to validate metrics used in the suggested framework to measure the discussed attributes in different scenarios. Framework's prototype is under production, and it is the most important goal for future work.

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